

MIL-C-8135A(USAF)

28 November 1956

Superseding

MIL-C-8135(USAF)

30 January 1953

MILITARY SPECIFICATION

CLOTH, COATED, NYLON, BUNA N COATED, 1 SIDE

1. SCOPE

1.1 This specification covers one type of coated nylon cloth to be used in the construction of survival containers.

2. APPLICABLE DOCUMENTS

2.1 The following documents, of the issue in effect on date of invitation for bids, form a part of this specification:

SPECIFICATIONS

Federal

CCC-T-191 Textile Test Methods

Military

MIL-P-6065 Packaging, Packing, and Marking of Cloth, Fabric, and Webbing

STANDARDS

Federal

Fed. Test Method
Std. No. 601 Rubber: Sampling and Testing

Military

MIL-STD-105 Sampling Procedures and Tables for Inspection by Attributes

MIL-STD-129 Marking for Shipment and Storage

(Copies of documents required by contractors in connection with specific procurement functions should be obtained from the procuring activity or as directed by the contracting officer.)

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3. REQUIREMENTS

3.1 Materials

3.1.1 Yarn (base cloth).- The nylon yarn used in the manufacture of the base cloth shall be a polyamide prepared from hexamethylene diamine and adipic acid or its derivatives. It shall have a melting point of $482^{\circ} \pm 10^{\circ}\text{F}$ when tested as specified in 4.3.2.2.

3.1.2 Coating material.- The coating material shall be Buna N synthetic rubber suitably compounded to meet the requirements of this specification. It shall be applied in such a manner that the cloth is evenly and entirely coated on one side.

3.1.2.1 Color.- The color of the coating shall be black.

3.2 Construction and physical properties

3.2.1 Base cloth.- The base cloth shall conform to the construction and physical property requirements specified in table I and the following subparagraphs:

TABLE I

Construction and Physical Properties (Base Cloth)	
Weight, oz/yd ² (max)	7.25
Thread count per inch (min)	
Warp	60
Filling	45
Yarn ply, warp and filling (min)	2
Breaking strength (ravel strip), lbs/inch (min)	
Warp	325
Filling	275
Tearing strength, lbs (min)	
Warp	20
Filling	20
Shrinkage, percent (max)	
Warp	2.0
Filling	2.0

3.2.1.1 Weave.- The weave shall be plain, one up and one down.

3.2.1.2 Color.- Unless otherwise specified, the color of the base cloth shall be natural (see 6.2).

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3.2.1.3 Nonfibrous materials.- Residual size, finishing oils, or other nonfibrous materials contained in the base cloth shall not exceed 2 percent.

3.2.2 Coated cloth.- The finished cloth shall conform to the construction and physical property requirements specified in table II and the following subparagraphs.

TABLE II

Construction and Physical Properties After Coating	
Width, inches (unless otherwise specified)	38 ± 1
Thickness, inches	0.0155 ± 0.0015
Weight, oz/yd ² (max)	12.70
Breaking strength, lbs/inch (min)	
Warp	450
Filling	350
Tearing strength, lbs (min)	
Warp	20
Filling	20
Elongation, percent (min)	
Warp	35
Filling	30
Coating adhesion, lbs per 2 inches (min)	12
Acidity, pH	5 - 9

3.2.2.1 Resistance to low temperature.- The coated cloth shall not crack or flake when tested as specified in 4.3.2.4.

3.2.2.2 Resistance to blocking.- The coated cloth shall show no signs of blocking (surface may adhere slightly).

3.2.2.3 Resistance to high temperature.- The coated fabric shall show no evidence of tackiness, blistering, or softening when tested as specified in 4.3.2.5.

3.2.2.4 Resistance to accelerated aging.- After exposure to accelerated aging, the coated cloth shall retain not less than 95 percent of its original breaking strength, and the coating shall show no signs of blooming, blistering, or cracking.

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3.2.2.5 Waterproofness.- The coated cloth shall show no signs of leakage through the unabrased portion, and not more than 5 milliliters of water shall pass through the abraded portion of the cloth when tested as specified in 4.3.2.6.

3.3 Length.- The length of continuous pieces or cuts shall be approximately 100 yards. Shorter cuts may be included in accordance with the following schedule, based on the yardage submitted on any contract or order:

- 75 percent in cuts of 100 to 125 yards.
- 15 percent in cuts of 25 to 100 yards.
- 10 percent in cuts of 15 to 25 yards.

3.3.1 Length of roll.- Regular rolls shall contain not more than 125 yards of cloth. Short lengths shall be rolled together to the specified roll size and the roll labeled to indicate that it is composed of short lengths.

3.4 Identification of product.- Each roll shall be marked for identification in accordance with Specification MIL-P-6065.

3.5 Workmanship.- The finished cloth shall be clean, evenly coated, and shall conform to the quality and grade of product established by this specification. The occurrence of defects shall not exceed the levels set by the applicable acceptable quality levels.

4. QUALITY ASSURANCE PROVISIONS

4.1 Classification of tests.- The inspection and testing of the cloth shall be classified as acceptance tests.

4.2 Acceptance tests.- Acceptance tests shall consist of:

- a. Sampling plan A and tests.
- b. Sampling plan B and tests.
- c. Sampling plan C and tests.

4.2.1 Sampling plan A.- For the inspection of the finished product, sampling shall be conducted in accordance with Standard MIL-STD-105. Samples selected shall be subjected to the tests specified in 4.3.1 and subparagraphs thereto.

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4.2.1.1 MIL-STD-105.- Except where otherwise indicated, inspections shall be in accordance with the provisions set forth in Standard MIL-STD-105. When Standard MIL-STD-105 specifies an action by the Government, it shall, at the option of the Government, be performed either by the Government or by the contractor under the supervision of the Government inspector.

4.2.1.2 Acceptable quality levels.- Acceptable quality levels shall be as follows:

- a. For yard-by-yard examination (4.3.1.1) - 4 major defects and 10 total defects per 100 units (yards).
- b. For overall examination (4.3.1.2) - 1 defect per 100 units (pieces).
- c. For examination for length of roll (4.3.1.3) - 1 defect per 100 units (rolls).

4.2.1.3 Inspection levels.- The inspection levels shall be as follows:

- a. Yard-by-yard examination (4.3.1.1).- Level III of Standard MIL-STD-105 shall be used. The lot size shall be expressed in units of 1 yard each. An approximately equal number of yards shall be examined from each piece in the sample. The number of pieces to be drawn shall be computed as follows:

$$\text{Number drawn} = \frac{\text{Yards in sample}}{35}$$

- b. Overall examination (4.3.1.2).- The pieces examined shall be those selected for yard-by-yard examination.
- c. Examination for length of roll (4.3.1.3).- The rolls examined shall be those rolls from which the pieces for yard-by-yard examination were taken.

4.2.2 Sampling plan B.- For the physical acceptance tests to be conducted on the base cloth, a sample, or samples, each at least 2 yards long shall be taken from each 10,000 yards of the base cloth prior to coating. Each sample shall be suitably marked for identification and shall be subjected to the tests listed below and specified in 4.3.2.

- a. Weight
- b. Thread count
- c. Yarn ply

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- d. Breaking strength (uncoated cloth)
- e. Tearing strength
- f. Shrinkage
- g. Acidity
- h. Nonfibrous materials
- i. Melting point (nylon yarns)

4.2.3 Sampling plan C.- For the physical acceptance tests to be conducted on the finished cloth, a sample, or samples, each at least 2 yards long shall be taken from each 10,000 yards, or fraction thereof, of the coated cloth submitted for acceptance at one time on any contract or order. Each sample shall be suitably marked for identification and shall be subjected to the tests listed below and specified in 4.3.2.

- a. Width
- b. Thickness
- c. Weight
- d. Breaking strength and elongation (coated cloth)
- e. Tearing strength
- f. Coating adhesion
- g. Low temperature
- h. Blocking
- i. High temperature
- j. Accelerated aging
- k. Waterproofness

4.3 Test methods

4.3.1 Examination of finished product.- Defects found during the examination shall be classified in accordance with 4.3.1.1 through 4.3.1.3. The Government reserves the right to require examination for any defects not included herein to determine compliance with the requirements of this specification and to classify such defects in accordance with the definitions contained in Standard MIL-STD-105 (see 4.2.1.1).

4.3.1.1 Yard-by-yard examination.- The required yardage of each piece shall be inspected and visual defects classified as listed in table III. The defects found shall be counted regardless of their proximity to each other except where two or more defects represent a single local condition of the cloth, in which case only the more serious defects shall be counted. A continuous defect shall be counted as one defect for each warpwise yard, or fraction thereof, in which it occurs. The unit of product for this examination shall be 1 linear yard.

TABLE III

Classification of Defects

Defects		Major	Minor
Blisters or lumps	Any size	X	
Crease	Permanent, resulting from faulty coating procedure	X	
Light area or window	More than 5 in a linear yard totaling more than 3 square inches	X	
Narrow width	Width less than minimum specified		X
Pinhole, cut, or tear	Any size	X	
Stain or streak	Coating compound stain or streak clearly noticeable at a distance of 6 feet		X
Uneven coating	Thin areas, where coating compound is missing or insufficient	X	
	Heavily coated areas, clearly noticeable at a distance of 6 feet		X

4.3.1.2 Overall examination.- The unit of product for this examination shall be one piece. The cloth shall be defective if it has an objectionable odor, uneven coating, or is unclean throughout.

4.3.1.3 Examination for length of roll.- The roll shall be examined for gross length. Any gross length found to be less than the specified minimum length or any gross length found to be more than 2 yards below the gross length marked on the piece ticket shall be considered as a defect with respect to length. The unit of product for this examination shall be one roll.

4.3.2 Physical acceptance tests.- The methods of testing specified in Specification CCC-T-191, wherever applicable, and as listed in table IV and 4.3.2.1 through 4.3.2.6 shall be followed. The physical and chemical values specified in section 3 apply to the average of the determinations made on a unit of product for test purposes as specified in the applicable test methods. Failure of any sample of cloth to conform to the requirements specified in section 3 shall be cause for rejection of the lot represented.

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TABLE IV
Test Methods

Test	Method No.
Nonfibrous materials	2611 1/
Acidity	2811
Yarn ply	4054 2/
Width	5020
Thickness	5030
Weight	5041
Thread count	5050
Breaking strength and elongation (coated cloth)	5100
Breaking strength (uncoated cloth)	5104
Tearing strength	5134
Accelerated aging	5804 3/
Blocking	5872

- 1/ Paragraphs on water soluble material, weight of desized specimen, residual ash, and total inorganic material are not applicable.
- 2/ The twist shall be removed and the number of ply counted.
- 3/ The specimen shall be exposed for a period of 150 hours. The coating shall face in toward the source.

4.3.2.1 Shrinkage.- After conditioning for not less than 4 hours, an 18-inch square shall be marked on a 20 inch square specimen by means of a template, using indelible ink. A metal tub of adequate size to accommodate the specimen prepared as described below shall be filled to within 3 inches of the top with water which shall then be heated to a boil. The specimen shall be placed in the boiling water in a "skein" form prepared by stapling two opposite sides of the specimen together to form a loop or "skein." This shall then be placed over a glass rod 1/4 inch in diameter and 21 inches in length. A glass tube 1/4 inch in diameter and 21 inches long, weighing approximately 45 grams, shall be placed inside the loop at the bottom. The loop shall then be suspended in the boiling water bath by attaching it to another glass rod 24 inches long and 1/4 inch in diameter by means of twine or wire. The 24-inch glass rod shall rest on the top of the tub allowing the specimen to hang freely in the bath. The specimen shall be subjected

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to the action of the boiling water bath for a period of 15 minutes after which it shall be removed from the tub and allowed to drain for a few minutes. The staples shall be removed from the sample which shall then be placed flat on a horizontal screen to dry. After the specimen is dry, it shall be exposed for at least 4 hours to a standard atmosphere of 65 percent relative humidity and a temperature of 21.1°C (70°F). The 18-inch square shall then be measured in three places in the warp direction and three places in the filling direction, and the amount of shrinkage recorded.

4.3.2.2 Melting point (nylon yarns).— A suitable device, constructed so as to assure accurate determination of the point at which melting occurs, shall be used. The temperature of the device containing the nylon yarn may be raised rapidly to 400°F and then gradually raised until the nylon begins to liquefy. This temperature shall be considered the melting point and the average of ten specimens shall be reported.

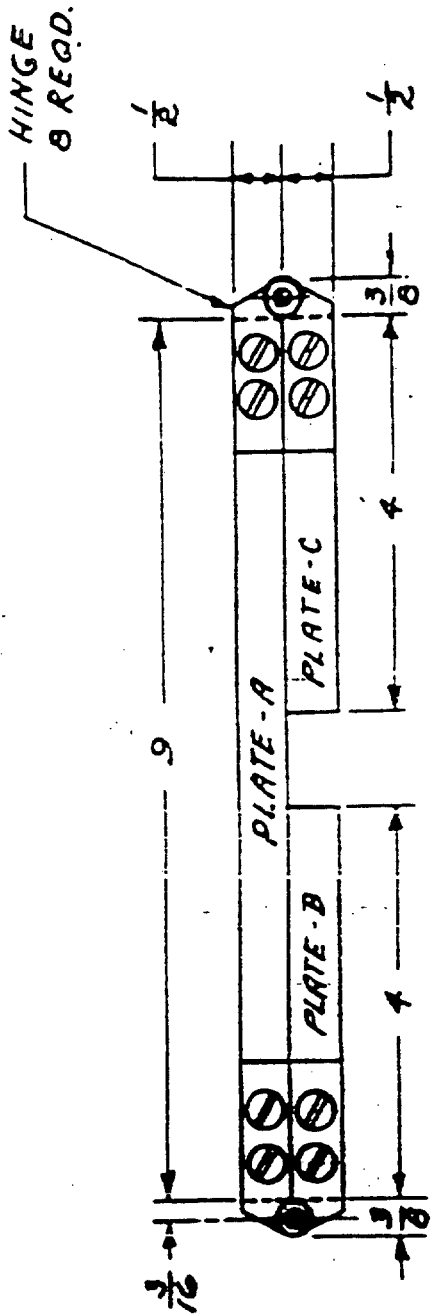
4.3.2.3 Coating adhesion.— Coating adhesion shall be determined by the friction strip test, machine method 8211 of Federal Test Method Standard No. 601. Specimens for test may be prepared by use of suitable cements or by the solvent method 5970 of Specification CCC-T-191.

4.3.2.4 Low temperature.— A 1-by 4-inch specimen with the long dimension warpwise and a 1-by 4-inch specimen with the long dimension fillingwise shall be exposed for 4 hours at a temperature of $-70^{\circ} \pm 5^{\circ}\text{F}$ with the temperature recorded at the lowest point in the chamber. The sample shall then be bent sharply, face out, over a 1/8-inch steel rod. The test jig as shown in figure 1 shall be used in performing the test and shall be placed at the same level in the chamber as the thermometer.

4.3.2.5 High temperature.— A 2-by 6-inch specimen shall be exposed for a period of 6 hours in an electrically heated oven maintained at a temperature of $170^{\circ} \pm 2^{\circ}\text{F}$. At the end of this period, the specimen shall be bent, coated side out, 180 degrees over a 1/8-inch mandrel and the coating shall be examined for signs of cracking, blistering, or softening. A test jig as shown in figure 1 shall be used in performing the test.

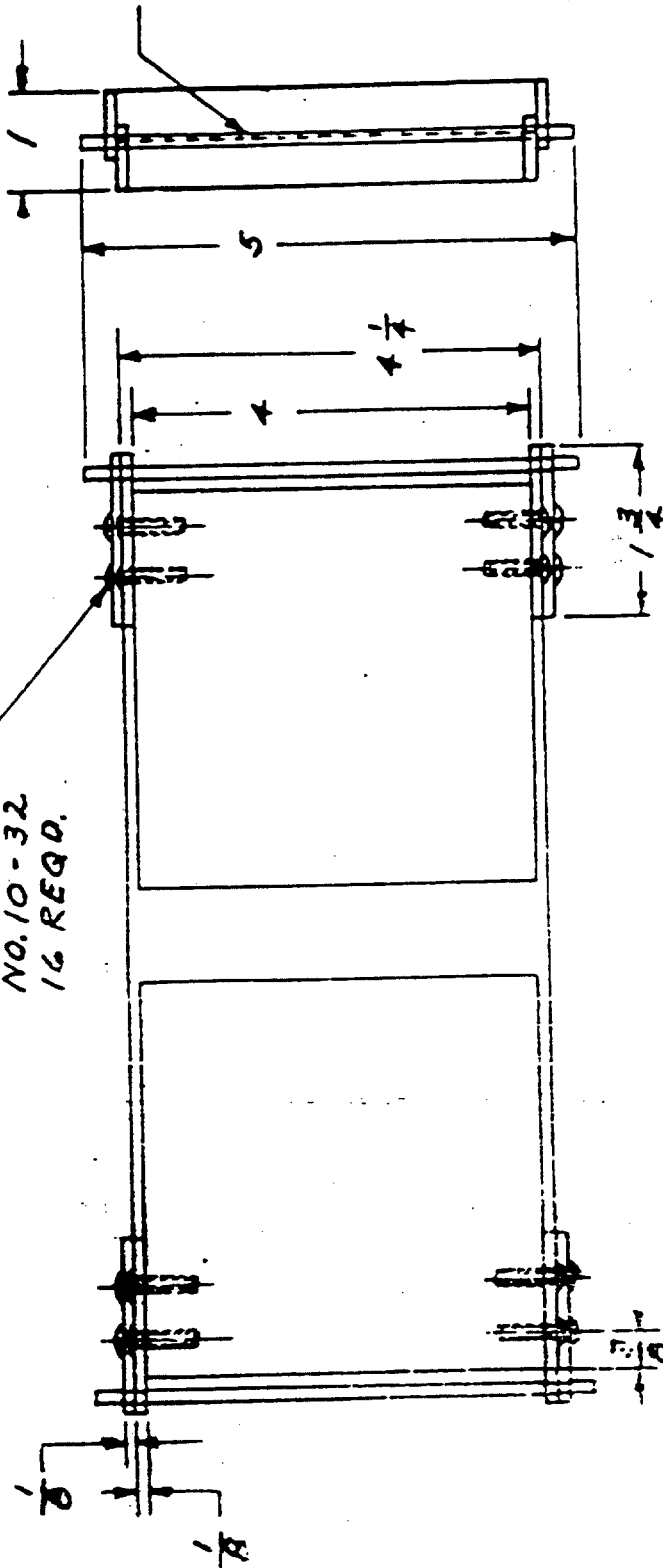
4.3.2.6 Waterproofness.— The waterproofness shall be determined using the apparatus described in method 5516 of Specification CCC-T-191. The temperature of the water shall be $80^{\circ} \pm 10^{\circ}\text{F}$. Before the specimen is placed in the apparatus it shall be abraded with grade 1/0 Garnet paper cemented to an 8 ± 0.1 ounce metal block 2 inches square. The specimen shall be laid on a flat surface, face up, and the Garnet paper and weight placed upon the face of the specimen. The abradant shall be grasped with the thumb and finger at the base of the block and moved gently across the specimen 5 strokes in each direction. The abraded area shall then be placed face up across the center line of the clamping head so that the center of the abraded area coincides with the center of the exposed part of the specimen. The water height shall be raised to 20 inches. The quantity of water leakage through the abraded portion shall be measured.

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SCREW
NO. 10-32
16 REQD.

PIN-HINGE
1/8 DIA.
2 REQD



MATERIAL: PLATES AND HINGES, ALUMINUM ALLOY.

WAVE PINS, STEEL ROD.

SAFETY MACHINE FINISH ALL OVER.

DIMENSIONS IN INCHES. FIGURE 1. IIG AS EMBLY-COLD CRACK TEST

5. PREPARATION FOR DELIVERY

5.1 Packaging and packing.- Shipments shall be packaged and packed in accordance with Specification MIL-P-6065.

5.2 Marking

5.2.1 Normal markings.- Unit packages, intermediate packages, and shipping containers shall be marked in accordance with the requirements of MIL-STD-129. The shipment marking nomenclature shall be as follows:

Cloth, Coated, Nylon, Buna N Coated, 1 Side

6. NOTES

6.1 Intended Use.- The coated cloth covered by this specification is intended for use in the manufacture of survival containers.

6.2 Ordering data.- Procurement documents should specify the following:

- a. Title, number, and date of this specification.
- b. Quantity desired.
- c. Color of base cloth desired.
- d. Level of packaging and packing required.
- e. Provisions for deduction of defects (if any).

NOTICE: When Government drawings, specifications, or other data are used for any purpose other than in connection with a definitely related Government procurement operation, the United States Government thereby incurs no responsibility nor any obligation whatsoever; and the fact that the Government may have formulated, furnished, or in any way supplied the said drawings, specifications, or other data is not to be regarded by implication or otherwise as in any manner licensing the holder or any other person or corporation, or conveying any rights or permission to manufacture, use, or sell any patented invention that may in any way be related thereto.